1. (currently amended) A method for determining formation fluid pressure in earth formation surrounding a borehole, the borehole defining a borehole wall, the borehole wall covered with mud cake forming a mud cake seal, the method comprising:

providing a tool defining a probe and a variable-volume pretest cavity fluid-coupled to the probe;

pressing the probe into contact with the mud cake;

expanding the volume of the cavity in sufficient amount to produce a break in the mud cake seal during a draw-down period;

detecting an occurrence of a break in the mud cake seal;

holding constant the volume of the cavity immediately after detecting the occurrence of the break in the mud cake seal, for a sufficient build-up period to establish pressure equilibrium between cavity fluid and formation fluid;

measuring pressure in the cavity; and

setting formation fluid pressure equal to measured pressure.

2. (currently amended) A method according to claim 1, wherein detecting an occurrence of a ~~the~~ break in the mud cake seal includes measuring cavity pressure and detecting an abrupt change associated with cavity pressure.

3. (previously entered) A method according to claim 2, wherein detecting the abrupt change includes using a finite moving average (FMA) algorithm on a function of cavity pressure.

4. (previously entered) A method according to claim 3, wherein the function of cavity pressure includes cavity pressure.

5. (previously entered) A method according to claim 3, wherein the function of cavity pressure includes a first derivative of cavity pressure.

6. (currently amended) A method according to claim 3, wherein the function of ~~tool~~ cavity pressure includes a second derivative of cavity pressure.

7. (currently amended) A method according to claim 1, wherein detecting an occurrence of a ~~the~~ break in the mud cake seal includes detecting a difference between a measured cavity pressure

and a corresponding cavity pressure from a reference cavity pressure profile.

8. (previously entered) A method according to claim 7, wherein the reference cavity pressure profile is measured in a previous drawdown with the cavity isolated from the formation.

9. (original) A method according to claim 1, further comprising:

expanding the volume of the cavity during the draw-down period at a predetermined constant rate.

10. (original) A method according to claim 9, wherein the predetermined constant rate is within the range of 3-160cc/minute.

11. (original) A method according to claim 10, wherein the predetermined constant rate is approximately 5cc/minute.

12. (currently amended) A tool for determining formation fluid pressure in earth formation surrounding a borehole, the borehole defining a borehole wall, the borehole wall covered with mud cake forming a mud cake seal, the tool comprising:

an elongated body adapted for downhole operation;

a probe, extendable from the elongated body, the probe defining an inflow aperture;

a pretest piston pump defining a variable-volume pretest cavity coupled to the inflow aperture;

control means, including

a) means for expanding the volume of the pretest cavity in sufficient amount to produce a break in the mud cake seal,

b) means for detecting an occurrence of a break in the mud cake seal, and

c) means for holding constant the volume of the cavity immediately after detecting the occurrence of the break in the mud cake seal, for a sufficient build-up period to establish pressure equilibrium between pretest cavity fluid and formation fluid;

and

a pressure sensor coupled to measure pressure in the pretest cavity.

13. (original) A tool according to claim 12, wherein the control means includes an electromechanically driven roller screw planetary system.

14. (original) A tool according to claim 13, wherein the control means further includes an electrically driven gearbox coupled to drive the roller screw planetary system.

15. (currently amended) A tool according to claim 12, wherein the control means includes downhole programmable control electronics coupled to control an electromagnetic assembly ~~the electromechanical control means~~.

16. (original) A tool according to claim 12, wherein the tool includes a constant-volume flow line.

17. (original) A tool according to claim 16, wherein the constant-volume flow line includes a dedicated probe.

18. (original) A tool according to claim 16, wherein the constant-volume flow line includes a flexible conduit.

19. (original) A tool according to claim 16, wherein the constant-volume flow line has a volume in the range 20 - 120cc.

20. (original) A tool according to claim 12, wherein the probe is located between the pressure measuring means and the variable-volume pretest cavity.

21. (original) A tool according to claim 12, further comprising a sample line coupled to the cavity, and an isolation valve located between the cavity and the sample line.

22. (original) A tool according to claim 12, further comprising an isolation valve located between the cavity and the formation fluid inflow aperture.

23. (currently amended)) A tool according to claim 12, wherein said ~~electromechanical~~ control means includes means for terminating expansion of the volume of the cavity on detecting an occurrence of a break in a mud cake seal.

[0032] FIG. 2 shows formation pressure tester tool ("FPTT") 20 of the invention located within wireline tester 10. The wireline tester is shown located in borehole 12, suspended from logging cable 17, and coupled electrically to surface system 18 via electrical wires in the logging cable.

[0033] FIG. 2 shows probe 21 protruding from elongated body 11 and in physical contact with formation 15 at one side of the borehole. With probe 21 in physical contact with the borehole wall, formation pressure tester tool is 20 is held stationary in the borehole by two distal hydraulic anchoring pistons 22 exerting counter-force against the opposite side of the borehole. ~~Pressure sensor 36 is coupled to measure pressure in the variable-volume cavity of pretest chamber 30. Downhole programmable control electronics 45 controls the sequencing and timing of the steps of the method by timing measurements from pressure sensor 36 and by controlling pretest piston pump 23. The pretest piston pump operates to control the volume of a variable-volume cavity (item 33 in FIG. 3). In the preferred embodiment the sampling rate for pressure measurements may be set as high as 120Hz.~~

[0034] FIG. 3 shows probe 21 pressed against mud cake 14 by hydraulic anchoring pistons 22, extending from probe driver 29. Pressure sensor 36 is coupled to measure pressure in the variable-volume cavity of pretest chamber 30. Downhole programmable control electronics 45 controls the sequencing and timing of the steps of the method by timing measurements from pressure sensor 36 and by controlling pretest piston pump 23. The pretest piston pump operates to control the volume of variable-volume cavity 33. In the preferred embodiment the sampling rate for pressure measurements may be set as high as 120Hz. Control electronics ~~Electronics~~ 45 controls pistons 22 via probe driver 29. ~~Downhole programmable control~~ Control electronics 45 also controls the pushing of frame 47. Hydraulic communication between the formation tester and the formation is achieved by breaking the mud cake seal at the inflow aperture 26 of probe 21. Resilient packer 25 isolates the fluid inside the formation tester from borehole pressure. Aperture 26 is coupled to variable-volume cavity 33 via flexible conduit 27 (of pretest flow line 32) and rigid conduit 28. Flexible conduit 27 accommodates the advancing and retracting motion of probe 21 in the direction of the double arrow in FIG. 3.